



- Over 12 megawatts from 1,200 systems
- Adding 300+ systems annually
- Residential and commercial behind the meter, community solar, feed-in tariff and utility scale
- Advanced metering with **net** consumption and **net** production

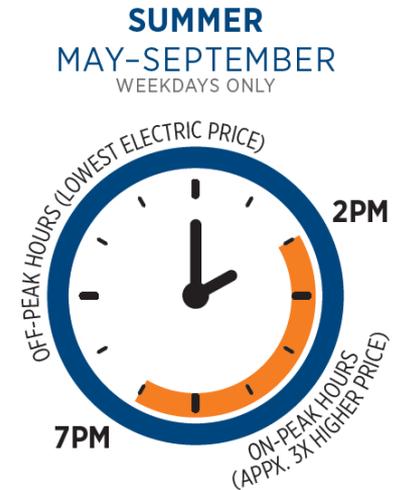


The Challenge: It's Complicated

- Time of day pricing structure for all residential customers
- Communicate rate structure impact
 - Solar system variability
 - Home use patterns
 - Bi-directional net metering
 - On-peak and off-peak hours
 - Days of the week
 - Seasonal price changes



x1200
unique
cases



Starts next Monday!

I don't understand; why are you doing this?

You're changing the rules of the game

You've ruined my return on investment

My panels are oriented wrong

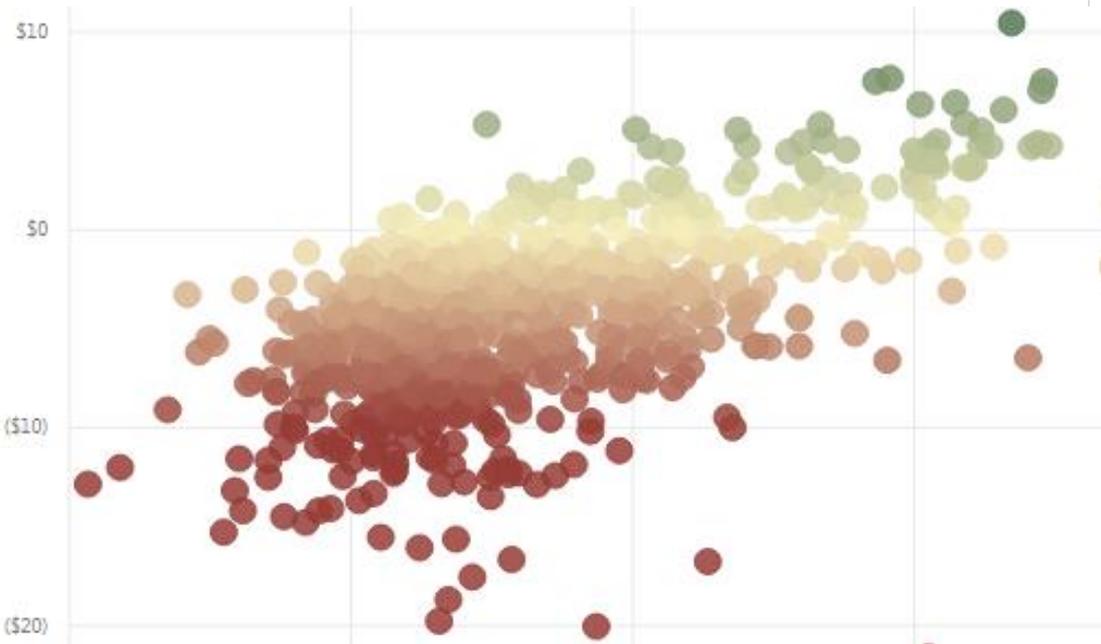
This will kill the solar market

I can't sell solar here anymore

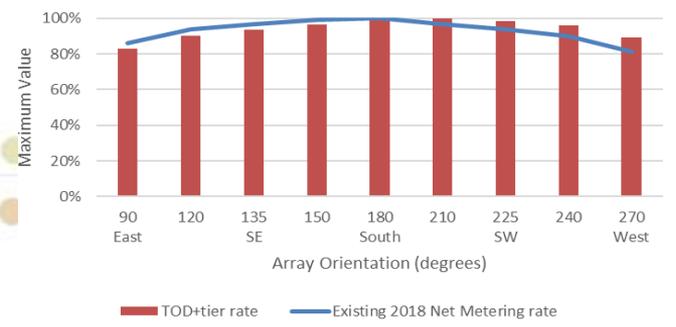


The common thread: it's personal!

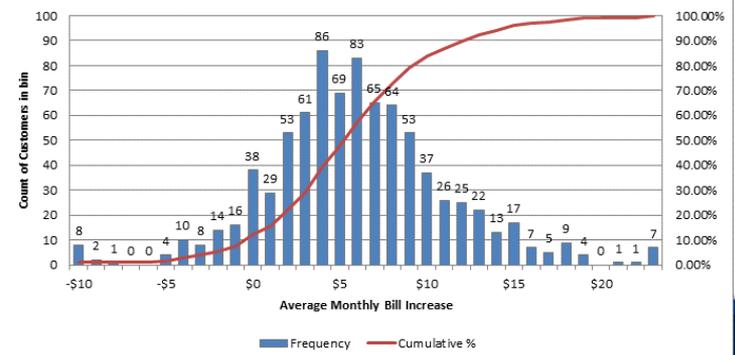
Analytics to the Rescue?



Annual Dollar Value of Solar Generation Varies by Orientation



Histogram of Solar Customer Bill Increase under TOD+tier Rate



Rooftop solar customers

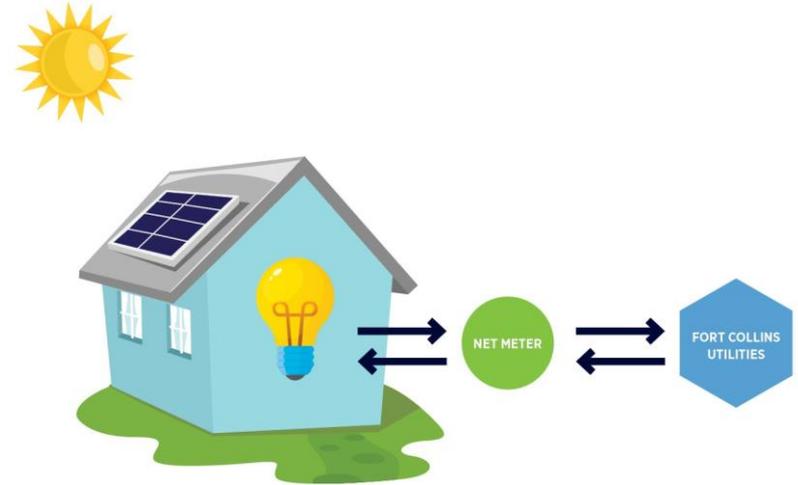
- Existing – how will this affect me?
- Potential – should I still do this?

Community solar “customers”

- Customers of both Fort Collins Utilities and Clean Energy Collective
How will this affect me?

Solar trade allies

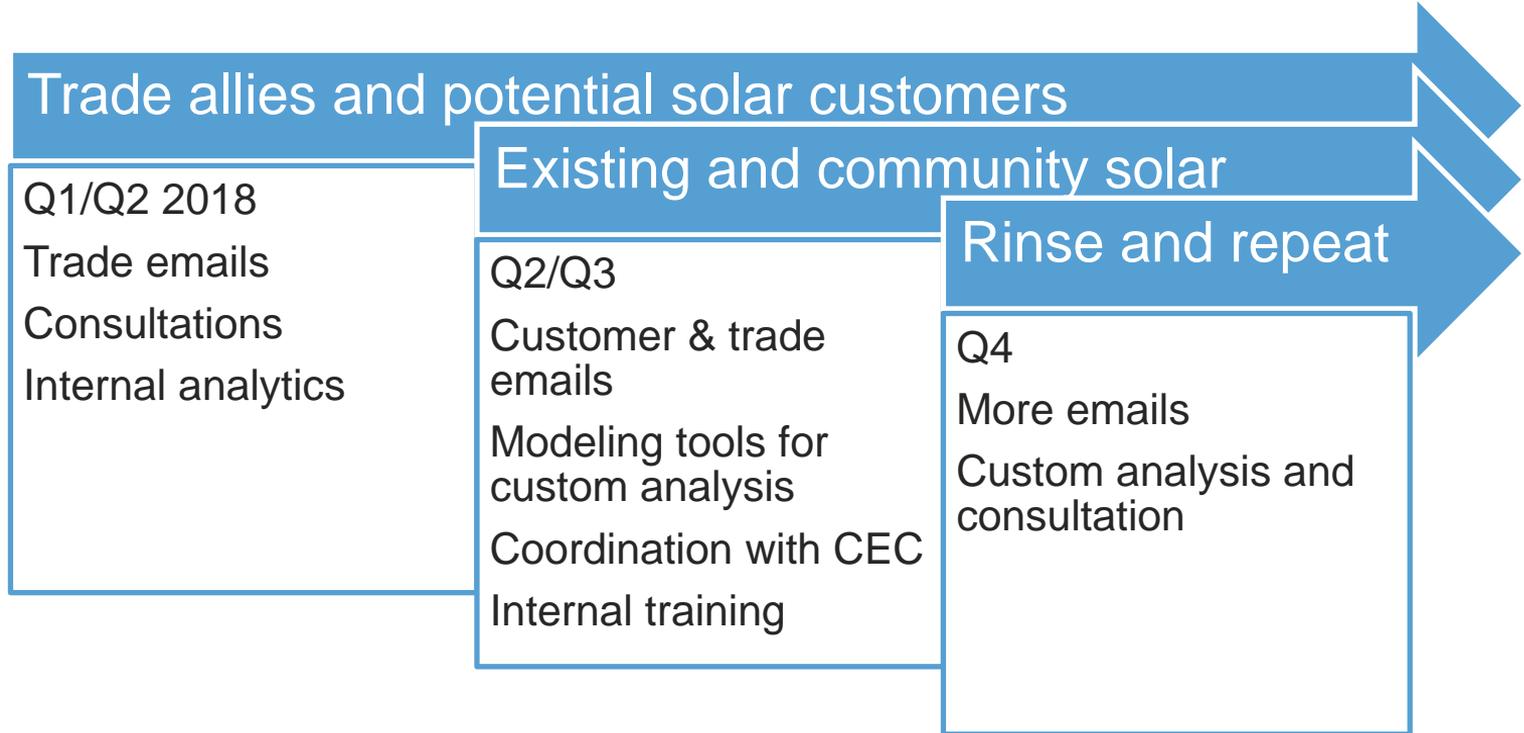
- How do I sell systems? Do I have the tools I need?



- Existing rooftop customers
 - South still best
 - Manage home use around TOD
- Potential rooftop customers
 - Solar still makes sense
 - Analyze with TOD
 - Shop around
- Community solar customers
 - Manage home use, still getting near retail value
- Solar trade allies
 - Adjust your sales pitch now for Time of Day



Step 3: Tactics and Timeline



Step 4: Prepare for Questions

Rate Analysis 2017 AMI

Pending

All

Neighborhood

All

Street Address with Building

All

Year Built

1868 2017

Utility Premise Number

All

Utility Customer Number

All

Rate Code Group (3)

All

Area ft² Built

0 33,572

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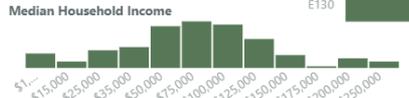
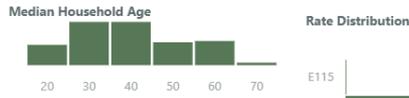
All Homes

712 Buildings 732 Units 627 Premises 626 Customers



Existing	(\$34.07)	(\$3.17)	(\$2.69)	\$5.99
TOD	\$36.76	Median	Average	Deviation
TODe	\$37.17	(\$4.04)	(\$3.10)	\$7.38
		Median	Average	Deviation

Optimal Rate Utilities Electric Heat ... County Electric Heat ...

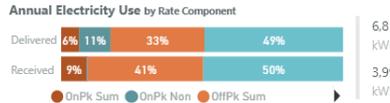


Rooftop Solar Inspection Da... 12/15/1999 12/31/2016

Premise List

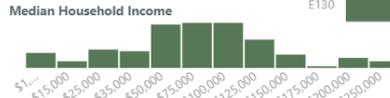
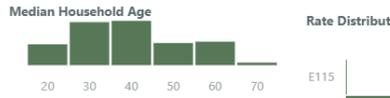
Natural Gas Heated Only

678 Buildings 698 Units 597 Premises 597 Customers



Existing	(\$32.77)	(\$3.31)	(\$2.89)	\$5.83
TOD	\$35.66	Median	Average	Deviation
TODe	\$36.17	(\$4.19)	(\$3.40)	\$7.11
		Median	Average	Deviation

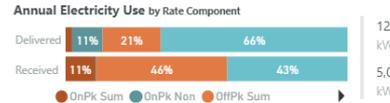
Optimal Rate Avg Monthly Cost Benefit of TOD vs Existing



County Electric HVAC Flag Utilities Electric Heat Flag

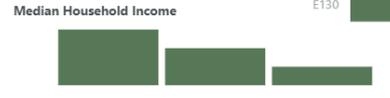
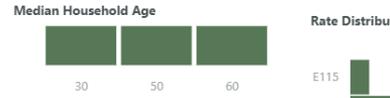
Electric Heated Only

34 Buildings 34 Units 30 Premises 29 Customers



Existing	(\$59.90)	(\$0.68)	\$1.42	\$7.52
TOD	\$58.49	Median	Average	Deviation
TODe	\$57.01	\$0.43	\$2.90	\$9.74
		Median	Average	Deviation

Optimal Rate Avg Monthly Cost Benefit of TODe vs Existing



County Electric HVAC Flag Utilities Electric Heat Flag

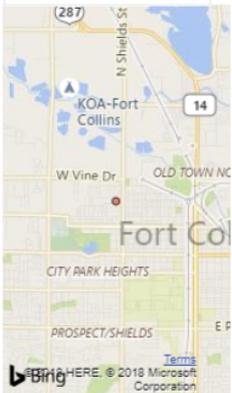
TOD Cost Estimator

Filter Street Address

All

Filter by Premise

61111
 61111
 61111



1 1 1
 Addresses Premises Customers

Filter Consumption Data

1/1/2017 12/1/2017

kWh Consumption

Usage (kWh) Solar Returned (kWh)



Monthly Average Cost Comparison

Existing Monthly Cost

\$4.63

Est. Electric Heat Cost

\$7.99

E130

Rate Code

Ok

Residential | Single-Family
 Building Classification

1
 Premise Count

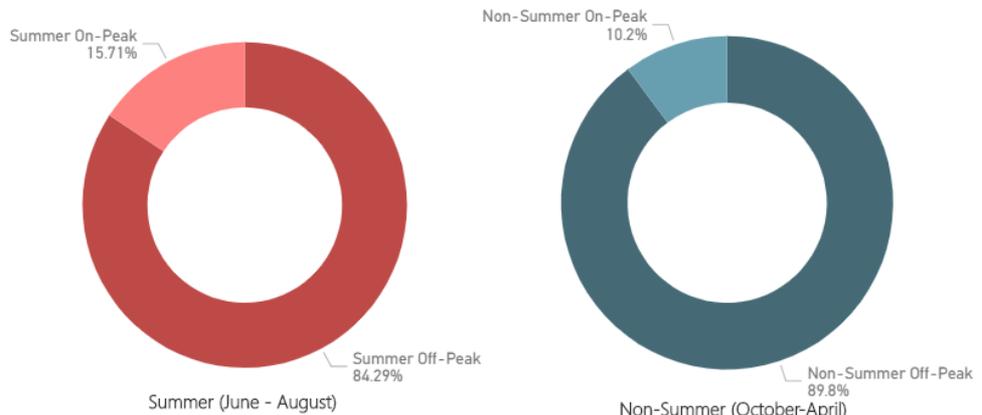
Electric Baseboard
 Heating Type

7/19/2016 12:00:00 AM
 Customer Move-In Date

2017 Baseline Usage

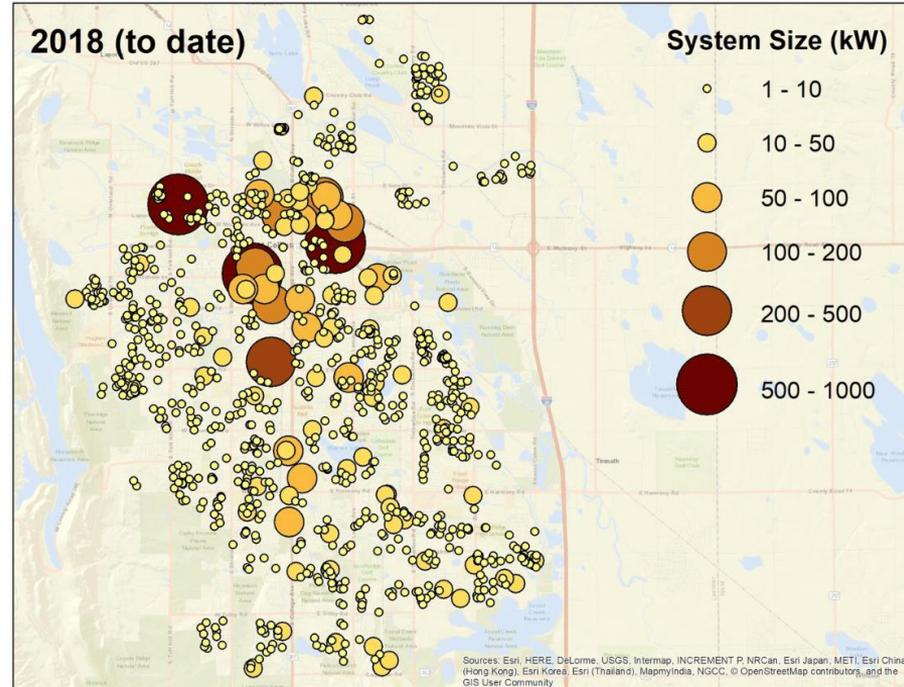
MonthName	Existing Cost	Elec. Heat TOD Cost
January	\$55	\$60
February	\$23	\$34
March	(\$7)	\$8
April	(\$22)	(\$6)
May	(\$18)	(\$25)
June	(\$13)	(\$24)
July	(\$11)	(\$17)
August	(\$7)	(\$12)
September	(\$1)	(\$8)
October	(\$2)	\$11
November	\$20	\$31
December	\$38	\$44

Average On and Off-Peak Electric Use



Lessons Learned (so far)

- Solar customers are amongst the most engaged
- Steep learning curve for all
- Averages are not necessarily helpful
- Unknown behavior change
- Beware % bill impacts
- More data, always
- A customer quote:
 - *I'm going to buy a battery, arbitrage against your rate and get the **ultimate win***





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